GrummanWorld

Volume 8, Number 6 | Our Employees Are Our Major Shareholders | March 24, 1989

Grumman Experiment Flies Aboard Discovery

A Grumman-designed experimental radiator element was tested during the recent mission of the space shuttle *Discovery.*

The radiator is officially called the Space Station Heat Pipe Advanced Radiator Element (SHARE), and the experiment measured its ability to expel heat into space. The experiment could lead to a contract to build the radiators for the space station *Freedom,* which will go into orbit in 1995.

Radiators would be a key part of the station's thermal control system. They would be connected to a thermal bus, a network of pipes that would gather waste heat from the station's modules. The radiators would expel the collected heat into space; cooled liquid would flow back into the thermal bus system.

The shuttle lifted off on Monday, March 13, from Kennedy Space Center. The radiator element was tested Tuesday, March 14, through Friday, March 17, as the shuttle's main mission payload.

Grumman's competitor for work on the radiator is Lockheed. Lockheed is part of a McDonnell Douglas-led team that won work package no. 2 in 1987, which includes thermal systems. However, Lockheed's radiator design has not performed well as Grumman's in related ground tests at Johnson Space Center in Houston.

The Grumman radiator element is 50 feet long, one foot wide, and an inch thick. It was built by Grummanites in Bethpage's Building 5 and tested in Buildings 14 and 31. A 75 kilowatt radiator structure on the space station would consist of 50 such elements, each of which could operate if the others failed.

"This is an important consideration for the space station," says Fred Edelstein, project engineer. "If a meteorite punches out one segment, the others still work."

The design uses heat-pipe technology and has no moving parts. A heat pipe is a sealed enclosure containing a single fluid in both its liquid and vapor state. It transfers heat through evaporation and condensation.

For the experiment, the radiator was mounted on the starboard sill of the shuttle bay door, the area where the door meets the body of the shuttle. Three separate tests were run, each lasting three hours (two orbits).

In the first exercise, the shuttle was turned so the payload bay faced the earth. Special heaters on board warmed the fluid in the radiator. This particular experiment tested the device's ability to radiate heat into a warm environment. Next, the shuttle was turned in the opposite direction, and the radiator expelled heat into deep space.

"What the radiator is looking at determines how much heat can be dissipated," says Edelstein. "When it is focused on a cold environment, much more heat can be expelled."

On board the space station, the radiators would permanently face away from the sun. By contrast, the solar collectors would face the sun.

The third three-hour experiment tested the radiator's ability to re-prime, or resume operation after a jolt. The shuttle's thrusters were turned on for this purpose. Previous studies have shown that sudden movement causes fluid to flow in the wrong direction, and results in a momentary lapse in operation.

"In ground tests, our radiator has re-primed very quickly," says Edelstein.

Now that the flight is over, the Grummanites in Space Systems are carefully studying the data from the experiment, which showed some unexpected problems during startup. They must compare their earlier predictions to its performance in flight.

Sometime this month or next, both Lockheed's and Grumman's radiator designs will be tested again at NASA's Johnson Space Center. This summer, McDonnell Douglas is expected to make a decision about the subcontractor for the radiators and the thermal bus system.

This is the second time Grumman has flown a radiator experiment on a space shuttle flight. The first was aboard STS-8, which was launched in August, 1983. That radiator was a smaller version of the current one and worked flawlessly.

Additionally, a heat pipe experiment was begun in 1984 aboard the Long Duration Exposure Facility (LDEF). This 30-foot-long structure was launched into orbit during a shuttle mission, and contained a variety of industrial experiments.

Edelstein was the project engineer on the heat-pipe experiment; a second was a materials experiment developed by Dr. Richard DeIasi, now director of Corporate Research. They will finally get to see their results in November, when LDEF is expected to be brought back to earth.

LDEF was supposed to return in 1985, but was delayed by shuttle schedule slips and the January, 1986, *Challenger* disaster. The current experiment was also delayed approximately three years from its originally scheduled flight.

Roll Tape. *Grumman Chairman John O'Brien recently addressed a group of Grummanites from Data Systems. His presentation will be part of a new videotape on Grumman Quality which will be used to train the Data Systems work force. (Photo by Bob Settles)*

GrummanWorld
Grumman Corporation
A22-GHQ
Bethpage, N.Y. 11714

Bulk Rate
U.S. Postage
Paid
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Permit No. 1110

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A Long Awaited Match. *A-6 aircraft number E-185 is the first to receive the new Boeing composite wings. Delivery of the wings was delayed about a year because of production problems. Grumman expects delivery of five additional sets of wings this month. E-185 will be ready for delivery to the Navy by the end of this year. (Photo by Gerry Costello)*

A-6 Gets First Set Of Composite Wings

Grumman A-6 aircraft number E-185 recently received the first new set of composite wings made by Boeing. Delivery of the new wings had been delayed about a year because of production problems.

"We are confident that all the major obstacles are behind us now," says Dan Collins, A-6 vice president. "These wings are probably the largest composite structures ever made. It just took more time and money to build them than expected."

In the mid-1980s, the Navy realized that many A-6 wings would reach the end of their service life before replacement planes would enter the fleet. It asked for bids on replacement wings for fleet aircraft. Boeing bid a composite design and Grumman offered an updated metal wing.

Boeing won the $1.2 billion contract in 1985. The first composite test wing was supposed to be delivered in November 1987, with a rate of six wings a month achieved by mid-1989.

However, the first wing wasn't delivered until November 1988 and it was incomplete. "We're going to use that wing for fatigue testing of the fuselage," says Collins.

In September, the Navy asked Grumman to build 10 metal wing sets for the Intruders as a stopgap measure. That work would have been worth $20 to $25 million. However, the Navy canceled that order several weeks ago after Boeing appeared to be getting back on schedule.

"Fortunately we only got as far as ordering the purchased parts for those wings," says Tom Zehner, A-6 program director.

E-185 is the first production aircraft built with fiscal 1987 dollars. It will be ready for delivery by the end of this year — a year late due to the wing delay. Grumman will build 10 more aircraft under the same contract and another 10 with money from fiscal 1988. All will receive the composite wings as will 14 A-6's undergoing modification at Grumman's St. Augustine facility.

"We're hoping to receive five more wing sets from Boeing this month," says Collins. "Two will go to Calverton, St. Augustine will receive another two, and the other will go to a Naval aviation depot repair center."

After the wings are attached to the aircraft, it usually takes about seven months to complete production. All wiring and hydraulic lines, for example, must then be installed.

"However, because of the new wing program we're allowing an extra two months to start," says Zehner. "Once all the minor problems are worked out we'll get back on a six or seven month schedule."

New A-6 aircraft production work should be completed by 1991. Modification work is expected to continue for about five years.

Now that Boeing has its production on schedule, Collins says most of its wings may have to be put into storage, unless Grumman gets a follow-on contract to modify additional A-6's. "Boeing is under contract with the Navy to build 174 sets of wings," says Collins. "Right now, combining new production aircraft with modification work, our contracts require only 35 sets of wings."

Although the A-6 was not included in the budget for 1989, Collins says he's optimistic that a significant modification program will be included in the fiscal 1990 budget. "The current Navy plan has the A-6 in the fleet until the year 2008," says Collins. "The aircraft will have to be updated significantly to handle that longevity."

Next Lecture Will Shed New Light

The eighth Leroy R. Grumman Lecture will be held Monday, April 24, 4:30 p.m., in the Headquarters auditorium.

Guest lecturer will be Dr. Michael Knotek, chairman of the National Synchrotron Light Source at Long Island's Brookhaven National Laboratory.

Dr. Knotek will speak on "Synchrotron Radiation and the New Mandate: Research, Education, and Technology Transfer."

Synchrotron radiation will aid the experimental processes in metallurgy, geoscience, and the life sciences.

Such radiation is generated by charged particles, usually electrons, moving at the speed of light in a magnetic field.

That produces a very bright beam — 10,000 to 10 million times brighter than common light sources. Such a beam lets the scientist perform analyses of surfaces, small particles, interfaces, dilute material, and other technologically important details.

All Grummanites are invited to the lecture, but you must reserve a seat. To do so, call Mary Mickol at (516) 575-3766 or 8770.

You're Invited To Get Informed

Are you interested in foreign policy? All Grummanites are invited to a presentation, in Headquarters Auditorium Thursday, April 13, at 5 p.m., on the complex Persian Gulf situation.

The presentation is sponsored by Grumman's Great Decisions program. The guest speaker will be Lawrence Potter, an expert in Middle Eastern affairs and a senior editor at the Foreign Policy Association.

Potter will talk about "The Persian Gulf: Reassessing the U.S. Role." Potter previously was a foreign affairs analyst with the Congressional Research Service, Library of Congress. He also taught for several years in Iran.

The Great Decisions program is a nationwide network of foreign policy discussion groups. It is sponsored by the Foreign Policy Association, a nonprofit, nonpartisan educational organization.

Shareholders' Meeting: Thursday, April 20, Building 4, Bethpage

Grumman Enters Race To Build Computer Chip Maker

Grumman Space Systems is teamed with Brookhaven National Laboratory on Long Island in a race against time and the Japanese and European semiconductor industries.

Grumman's job is to take Brookhaven's X-ray synchrotron out of the laboratory and make the design an affordable industrial tool for the mass production of "mega-memory" computer chips. Such chips could mean supercomputers on a desk-top and America's return to leadership in the semiconductor industry. The Electronics Systems Division is subcontracted to Space Systems on the project.

The Defense Advanced Projects Research Agency (DARPA) and a consortium of 16 American companies formed a group called Sematech to spearhead the nation's semiconductor research. DARPA is funding the Brookhaven-Grumman effort. The companies in Sematech will be the eventual users if Grumman is successful in developing the commercial device with Brookhaven.

"Right now," says Ken Speiser, the director of Business Development for Electronics Systems, "the United States is basically out of the memory chip-making industry. Ninety-six percent of all memory chips are made in Japan."

The United States wants to recapture that market. To do that, a machine is needed that can mass produce circuit chips that have components and connectors far smaller than today's technology can produce. If such a machine can be made practical, memory chips that can hold one gigabit of data — a billion pieces of information — are envisioned.

IBM recently introduced a prototype of a 64 megabit (64 million bits) chip, an achievement Tony Favale, the deputy director of Energy Systems, calls "awesome. The best on the market today in commercial quantities is a one megabit chip."

Because of their short wave-lengths, X-rays seem to be the answer, based on research with Brookhaven's 74-meter diameter synchrotron ring. In fact, IBM's prototype chip was produced there. Using X-ray lithography, 4,200 circuits could fit across the width of a letter "T" in this print.

X-ray lithography won't change the basic production principles behind semiconductor chips. Circuit chips are made like a photographic print. First a mask — the equivalent of a photographic negative — is made of the circuit. This is done by photographing huge, often wall-sized drawings of layers of circuitry, then reducing the images. Light or other electromagnetic radiation is projected through the mask onto a base material, such as silicon. This can be done several times with different masks to produce different parts of the ultimate circuit chip. The images are developed and etched and conducting material is added to build the circuits.

The more you can reduce the image, the smaller and more powerful the chip. But there's a limit. Various light sources start to scatter as the images get finer and smaller. The idea is to use beams that scatter little: X-rays.

However, the Brookhaven machine is a research instrument. It needs nuclear physicists to run it. That is where Grumman enters the scene.

"We have two goals," says Favale. "We have to come up with a compact ring, and we have to transfer our development to industry. There's potential for a business for Grumman." He believes the potential is 30 to 40 machines in the United States for Grumman out of a total of 180 worldwide. Grumman will manufacture and sell the synchrotrons to the chip manufacturers.

But some big engineering obstacles have to be cleared. Electrons accelerate around the ring like race cars at the Indy 500. The smaller the synchrotron ring, the tighter the turns. The tighter the turns, the harder it is to keep the electrons from crashing into the ring's walls.

Sophisticated super conducting magnets and control systems are needed. General Dynamics is subcontracted to Grumman to develop the magnets. Space Systems and Electronics Systems are now working on the instrumentation and control problems. Several Grumman engineers are now working with Brookhaven on transferring the synchrotron technology to Grumman.

By the end of this year, Grumman and Brookhaven plan to have a low energy version of a commercial size synchrotron to learn more about how to operate and control the machine. In two years, Favale says they plan to have a working X-ray synchrotron for development, and to deliver a production unit in 1992.

That goal is none too soon because the competition to make factory X-ray lithography machines is fierce.

A Japanese government-backed group of 13 companies and a European consortium of companies are well into their own X-ray lithography programs. "The U.S. program looks like it's two to three years behind," says Speiser. "Unless the United States steps on the gas, we will never be able to catch them. You have to understand that it's easy to manipulate the chip market if you are also the tool supplier."

But just to start, the American effort first had to clear some political hurdles.

It required federal legislation to keep antitrust laws from prohibiting the formation of Sematech. And the cost of the X-ray lithography research effort is so great that federal funding was needed.

Because such chips will have an immense impact on the electronics industry, Grumman's work takes on special meaning. Says Speiser, "The ramifications from defeat could be significant for the nation."

Medical Offers Cholesterol Screening

The Medical Department will offer cholesterol screening again this spring. Last year, almost 5,000 Grummanites took advantage of this offer. Before you take the test this time, however, there are a few considerations you should note to help insure accurate results.

It is not necessary to fast for the cholesterol test. Fasting is only required when a lipoprotein analysis is being done. That's when the LDL and HDL (good and bad cholesterol) levels are analyzed separately as well as your tryglycerides level.

"The lipoprotein test takes a lot more time and money," says Ada Colter, nursing coordinator. "If your total cholesterol level is below 200 mg. or from 200-239 mg. without two additional risk factors for coronary disease it is not necessary to obtain a lipoprotein analysis."

Risk factors for coronary heart disease include hypertension, smoking, diabetes, severe obesity, being male, a history of coronary heart disease or premature coronary heart disease in a family member (prior to age 55).

Total cholesterol amounts vary on a daily basis. Therefore, if the screening shows your cholesterol to be above 200 mg, wait a week and then repeat the test sometime in the next eight weeks. The average of the two results will confirm if your level is still high.

These are some factors that can affect your level of cholesterol at the time of the screening.

- Be seated at least five minutes prior to the test or a slightly elevated count will be given.
- Cholesterol levels increase during pregnancy and remain elevated for up to 20 weeks after delivery.
- Viral infections, some medications, recent surgical procedures and recent weight loss may interfere with accurate test results. Wait two months after cardiac surgery, heart attack or stroke before checking your cholesterol level.
- The test taker should not squeeze your finger. This causes the blood to become diluted therefore producing inaccurate low results.

The cholesterol testing at Grumman will be done by the Top of the Line Health Industries. The fee is $7. Below is the schedule for screenings.

Upcoming Screenings

Monday, March 27	Bldg. 12	11 p.m.-2 p.m.
Wednesday, March 29	Bldg. 237	1 p.m.-4 p.m.
Thursday, March 30	Bldg. 4	11:30 a.m.-2 p.m.
Monday, April 10	Bldg. 3	11 a.m.-4 p.m.
Thursday, April 13	Bldg. 40	11:30 a.m.-2 p.m.
Friday, April 14	Bldg. 40	11:30 a.m.-2 p.m.
Wednesday, April 19	Bldg. 30	11:30 a.m.-2 p.m.
Thursday, April 20	Bldg. 47	11:30 a.m.-2 p.m.
Friday, April 21	Bldg. 2	11 a.m.-3:30 p.m.
Monday, April 24	Bldg. 5	11:30 a.m.-2 p.m.
Tuesday, April 25	Bldg. 6	11:50 a.m.-12:30 p.m.
		2:30 p.m.-4:30 p.m.
Wednesday, April 26	Bldg. 7	11:50 a.m.-12:30 p.m.
		2:30 p.m.-4:30 p.m.

World's Largest Collider To Seek Nuclear Secrets

Grumman out to build part of 52-mile proton smasher

Grumman wants to play a role in the U.S. exploration of inner space — the microscopic world of the atom. The U.S. Department of Energy is building a superconducting super collider in Waxahachie, Texas.

When completed in the mid- to late '90s, it will be the largest nuclear accelerator in the world. Accelerators are to particle physics what telescopes are to astronomy, or microscopes to biology. This accelerator will be underground. It will form two, 52-mile long rings around Waxahachie. Each ring will have 3,840 pipe-like segments that are nearly 66 feet long and about two feet in diameter.

Grumman Space Systems Division, teamed with the Italian company Ansaldo, is competing against 16 other teams to build the super collider's rings. Two or three winners will be selected by the Department of Energy. According to a Universities Research Association report on the super collider, the rings and some attached systems will cost about $1.5 billion in 1986 dollars.

Ansaldo builds power plants, turbines, electric railroad cars and accelerators. It is one of only two companies in the world with experience manufacturing superconducting coils similar to the supercollider planned for Texas.

Grumman has plenty of experience for this kind of work, too.

"We've done a lot of particle beam work for the Department of Defense and we've built cryogenic systems," says Tony Favale, Space Systems' deputy director of Energy Systems. Cryogenics are needed because the ring will operate under extreme cold.

The super collider will help scientists study the physics of high-energy, subatomic particles. Protons are one of the basic particles that make up atoms.

One hundred and thirty trillion protons will be injected into rings and accelerate aroundthem at speeds of nearly the speed of light. Like a demolition derby gone wild, they will smash into each other 100 million crashes a second, each crash creating a microscopic fireball of 40 trillion electron volts of energy.

Among the debris, researchers will be looking for particles so tiny that they make protons look like planets: they hope to find the glue that holds all matter together. This research may help prove theories like the Big Bang, which says this planet and all the stars in the sky were, at time "zero," squeezed into a ball of matter one tenth of a millimeter across.

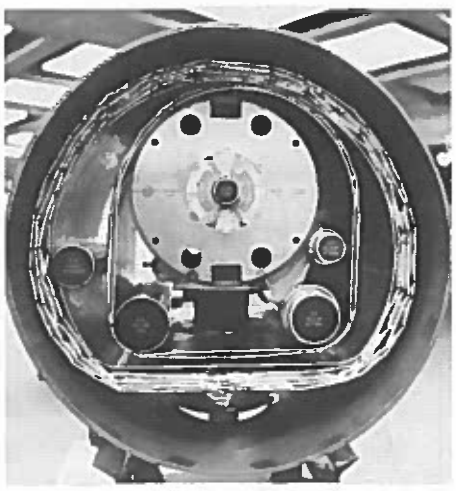
"The rings are high precision, close tolerance assemblies," says Favale. Each section will contain several assemblies. Cylindrical, stainless steel retaining collars will house superconducting magnets whose energy will keep the protons traveling down the middle of this assembly. "The purpose of using superconductor magnets is that you don't need a lot of electricity for electromagnets," adds Favale. "All you need are refrigerators."

To make the magnets superconductors, they've got to be cold — about 4o Kelvin, or about minus-457° Fahrenheit. The magnets will be inside a sheath of liquid helium, which will be inside a sheath of 20° Kelvin liquid nitrogen.

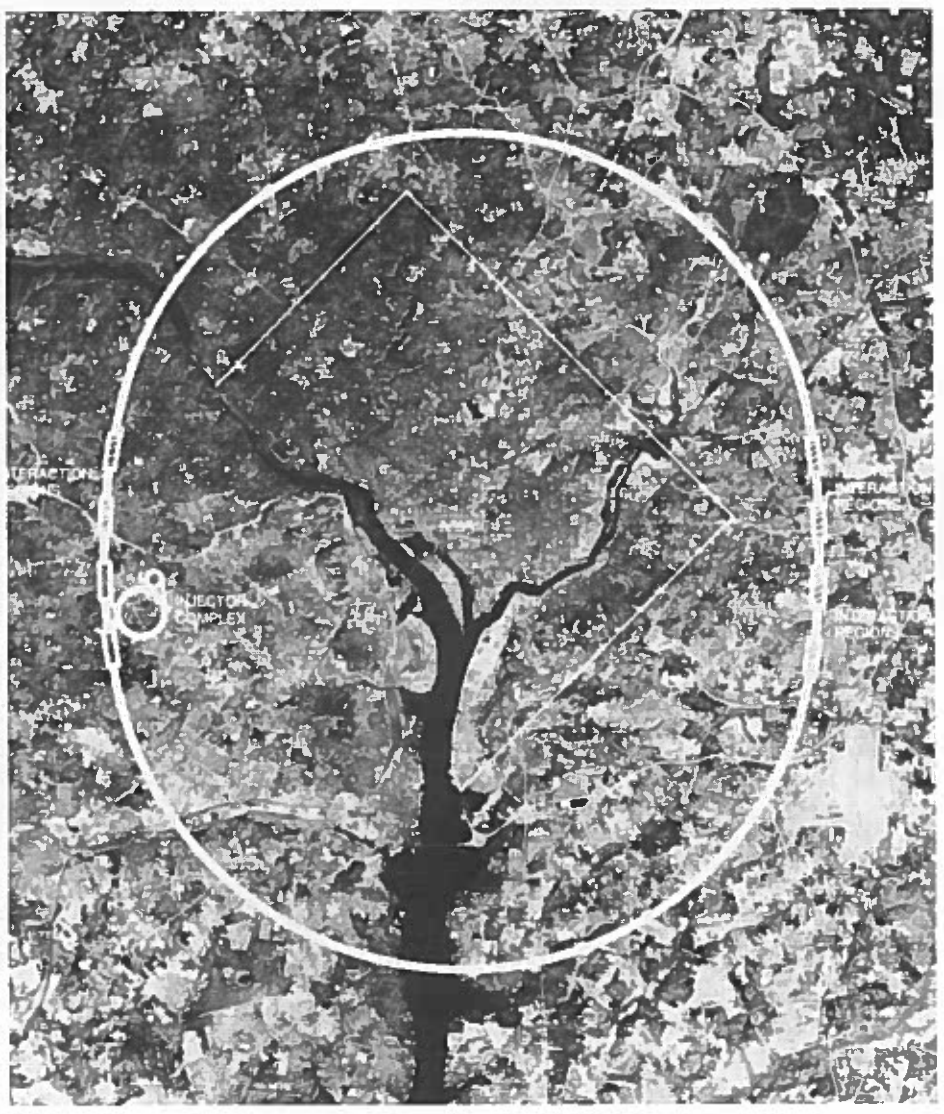
The cooling components are called cryostats. Building them is Grumman's job, as is the management, assembly and testing for the team. Ansaldo will build the magnets.

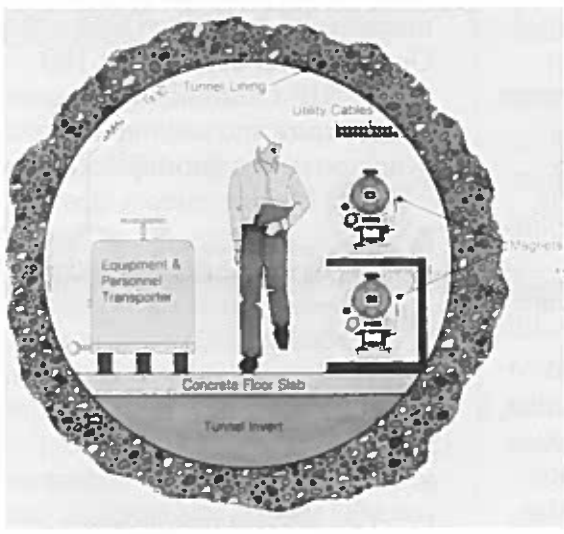
Right now, all the teams are working on their assembly procedures. In May or June, the Department of Energy will put out a request for proposals for Phase 2. "Five companies will be selected for Phase 2," says Favale. "Each one will build 50 superconductor sections. The first 20 will be to show reproducibility, and the next 30 to show production rate."

When the super collider is finished, the rings will be enclosed in a 10-foot diameter concrete tunnel, 30 feet underground. The ground above will be safe from radiation. In Switzerland, the land above another rather large accelerator is farmed. About 3,000 people, counting visiting scientists, will work at the completed research center in Waxahachie.



What's Inside. *This shows a cross-section of the supercollider's ring. Grumman is working on the outer portion that chills the magnets — the two segments around the beam tube.*





One Big Ring. *To give you an idea of how big this ring is, the photo above shows an outline of the ring superimposed on a satellite photo of Washington, D.C. The oval ring will be 17 and a half miles by 15 miles. Two counter-rotating proton rings will be inside a ten-foot diameter, underground tunnel (photo L). Near huge experimental halls, the beams will be deflected to collide nearly head-on.*

Obituaries

James Litterello of Facilities Engineering, Melbourne, Melbourne Systems Division, died March 9 at the age of 57. He had been with the company since 1957 and resided at 2727 North Wickham Rd., Melbourne, Florida.

Retiree Obituaries

Charles N. Bell of 718 Dale Place, Uniondale, N.Y., died Feb. 26, 1989. He retired in 1974.

George L. Kenney at S.R. 1, Box 500, Lakeville, Pennsylvania, died Feb. 27, 1989. He retired in 1968.

Edward C. Kramer of 263 Fulton St., Westbury, N.Y., died March 4, 1989. He retired in 1967.

Leslie S. Leiser of 76 Arlington Rd., Lake Ronkonkoma, N.Y., died Feb. 21, 1989. He retired in 1975.

Peter A. Lucatuorto of 449 Bohemia Pkwy., Sayville, N.Y., died March 2, 1989. He retired in 1973.

Arthur McCrum Jr. of 1146 Stewart Ave., Bethpage, N.Y., died March 3, 1989. He retired in 1984.

John Pavese at RFD #1, Box 72, Culpeper, Virginia, died Feb. 22, 1989. He retired in 1975.

Ralph W. Preece at Rt. 4, Box 123A, Lucedale, Mississippi, died May 14, 1988. He retired in 1975.

Honora H. Rafferty of 2 St. Martins St., Bethpage, N.Y., died March 7, 1989. He retired in 1972.

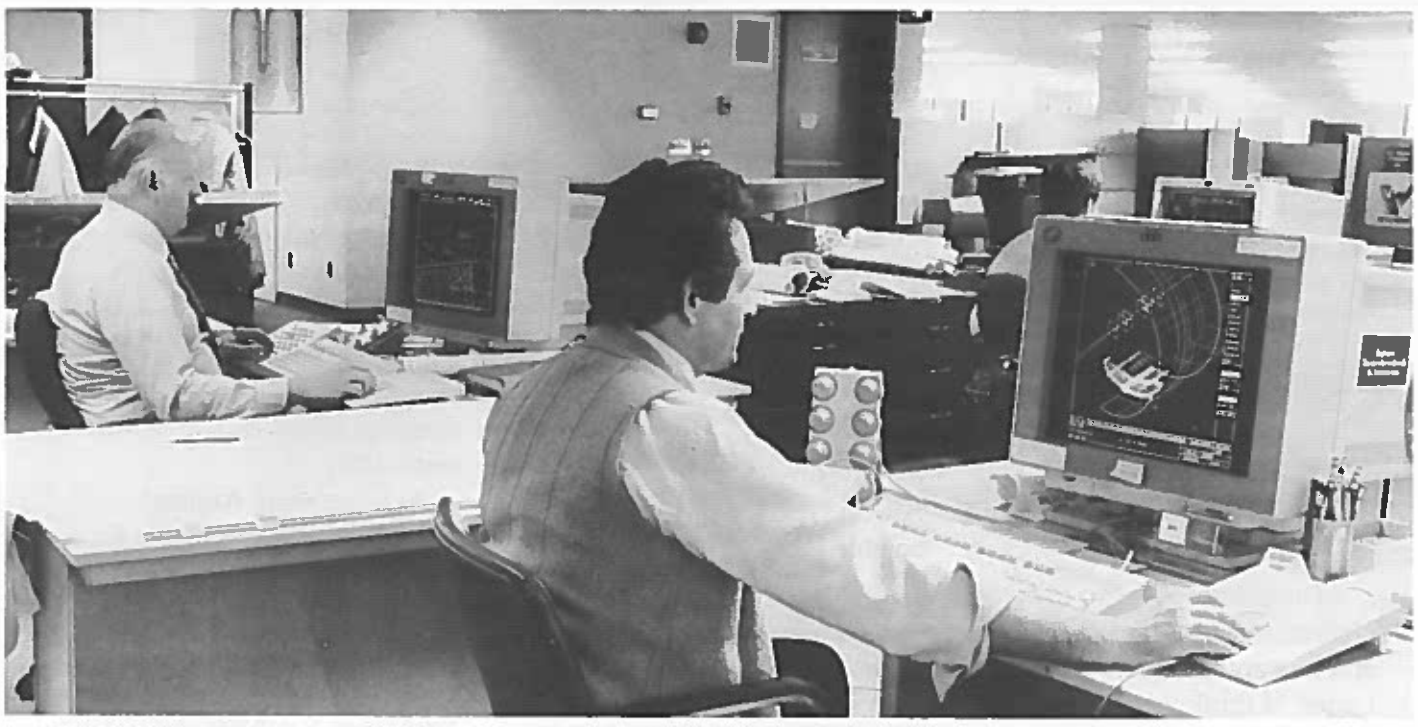
Personals

My family and I wish to extend our sincere thanks and gratitude to all our friends and co-workers at Grumman for their kindness, expressions of sympathy and support during the recent loss of my wife. **Bill J. Johnson**

The family of Bob Brandi wish to express their deep appreciation to all the people at Grumman. It's nice to know he had that many caring people around him. Your generous gift to the children will be put to good use. God bless all of you.

My family and I would like to express our sincere thanks to all our friends and co-workers for their prayers, cards, flowers and support during the recent loss of my husband Gordon. **Lorraine Alger**

My family and I express our sincere appreciation and thanks to all my friends and co-workers in Department 168 for their kind expressions of sympathy and support during the recent loss of my mother. **Anne Mariano**



New Approach. *In Melville, Long Island, John Zike and John Malesko work on designs for aircraft subsystems. The two Grummanites work for the Aerostructures group. A GQ team there recently came up with an effective way to plan the initial phase of any new business program. (Photo by Bob Settles)*

GQ Results In More Good Ideas

The Grumman Quality (GQ) process is continuing to make headway in divisions and departments throughout the company. The following teams recently came up with some creative solutions to problems in their areas. While they both represent Aircraft Systems, their ideas have use anywhere.

Getting Up To Speed

Whenever a new contract is won, there are a host of details to work out. Design changes to the baseline negotiated with the customer must be made. Desks and partitions must be moved. Schedules and budgets must be prepared. And so on.

A Grumman Quality (GQ) team in Aircraft Systems' Aerostructures group has developed a way to map out the early phase of any new program. A key part of the team's solution is a matrix chart that spells out departmental responsibilities and interactions with other areas.

"There are always growing pains in the beginning, and program startups are frequent in our area," says Bob Kroog, director of Total Quality Process for Aerostructures. "We're not only working on military subcontracts, but on commercial business. That mix can make for a variety of contract requirements."

To first get an understanding of the problem, the team interviewed people from all the functions and departments in Aerostructures. It studied the communication patters and data requirements that occur between groups when a new program begins. It asked each group what information it requires from the others, as well as the data it supplies.

"In the beginning of any new program, a lot of communication must go on between engineering, manufacturing, quality and procurement," says Joe Becker, manager of quality assurance - Boeing Programs. "However, if the variety of tasks aren't clearly defined, there can be a lot of mistakes or duplication."

The matrix chart the team developed acts as a checklist for both department heads and program management. The names of all departments are listed twice on the chart: horizontally and vertically, like the intercity mileage guide from a road atlas. The vertical column tells what information each group supplies, and to whom; read horizontally, it lists the data each should obtain, and *from* whom.

"In addition to eliminating duplication, this GQ solution will make sure everybody understands exactly what's required, and on what date," says team member Vin Padden, G-IV/F100 engineering manager. "It will mean fewer corrections — we'll be doing it right the first time."

Kroog sees the solution as an extension of the task teaming concept initiated by Corporate Technology. In this approach, people are organized by project, not by function or specialty as has been done in the past.

"We intend to share this solution," he says. "It would have use anywhere in Grumman where new projects require many departmental interfaces."

In the upcoming months, the team will monitor the results and modify the chart if necessary.

Better Buying

A second team in Aircraft Systems is improving the way design information is provided to Grumman's subcontractors.

"On some major development projects, procurements of aircraft subsystems have not met budget and schedules," says team leader Larry Helner, director of Preliminary Design. "We've determined that the problem lies in the technical requirements and specifications we provide to the subcontractor. There are too many 'TBDs' — to-be-determined items."

Parts are ordered early in a project, after which changes can occur. A theoretical example would be a weight requirement. If you tell the supplier to build a part that weighs less than 50 pounds, and change that to 25 pounds, the supplier may have to redesign it.

"In development programs, it's rare to be able to define everything at the very beginning," says Norm Reinertsen, vice president - Quality Operations, and a team member. "It's not an easy thing to do. The engineers don't have an unlimited amount of time to hone their specifications."

"But a TBD gives the supplier the opportunity to renegotiate his price and schedule, based on Grumman not providing all the technical parameters," notes Gary Scholl, director of Procurement Operations, Aircraft Systems Division.

"In many cases, the impact to a program of a schedule delay can be very high," Reinertsen says.

The solution: the development of procedures for preparing an invitation to quote (ITQ), the document that contains part specifications. When exact parameters cannot be made available, the supplier will be provided with a range.

Additionally, a newly established procurement readiness review board scrutinizes major ITQs. If design specs are too sketchy, the board sends them back.

"This is a solution where everybody wins: the customer, Grumman, and the supplier," says Reinertsen. "Grumman and the customer save money. The suppliers will like it because they will know their risk at the outset."

The team is also looking at the criteria for the use of government furnished equipment/information (GFE/GFI). These items are already designed; Grumman would not have to pay another company the development money needed for a subsystem.

Technical Details. *In EA-6B Procurement,, Vince Kommer, Don Weiman, and Carol Barton review invitations to quote. A GQ team has come up with a way to improve them.*

Taking Action

New business team leader: Joe Becker, quality manager, Boeing Programs

Members: Paul Butler, director, Nacelles and Thrust Reversers; Carlos Cacho-Negrete, C-17 engineering manager; John Conover, program manager, GE CF6-80C2 Transcowl; Vin Padden, engineering manager, G-IV/F100.

Procurement process team leader: Larry Helner, director of Preliminary Design

Members: Paul Bavitz, director, New Product Development; Victor Bloom, director, ILS Engineering; Bob Carri, director, Manufacturing Technical Operations; Dan Pliskin, deputy director, Advanced Programs; Norm Reinertsen, vice president, Quality Operations; Gary Scholl, director, Procurement Operations.

People

Gavin Honored

Former Grumman President Joe Gavin, Jr. was awarded the Ira C. Eaker Fellowship by the Central Florida chapters of the Air Force Association and the Aerospace Education Foundation. He received the award at the fifth annual Tactical Air Warfare Aerospace Foundation Gala held recently in Lake Buena Vista, Florida.

The gala saluted the 20th anniversary of the first manned lunar landing on July 20, 1969. Grumman built the Lunar Modules that took American astronauts to the moon's surface. Gavin led the Grumman effort.

The fellowship is an award in Gavin's name that helps generate funds to spread knowledge of America's military and civilian aerospace history.

'Thanks, Al'

Grummanite Al Lager helped the Defense Department revamp the Military Standards that govern the way contractors must write engineering change order proposals.

The Acquisition executive for the Naval Air Systems Command wrote to Lager, "Your personal willingness and desire to support the DoD Configuration Control discipline that is so crucial for assuring the readiness of our operational forces were exceptional."

Over the past several years, Lager, Grumman's manager of Configuration Management Technology, has been working to take the red tape out of Military Standards 480 and 481. He was on an industry committee nearly 10 years ago to simply revise the standards. "We generated so many comments that the Defense Department killed the revisions," Lager says. The DoD decided to rewrite the standards.

Al Lager

Two years ago, a joint military/industry team tackled the task in earnest. Lager was on its steering committee. Later, he did a major portion of the rewrite to finish the 100-page document.

"The purpose was to make it clearer, more understandable and less ambiguous," says Lager. "I think we got rid of most of the problem areas, or at least clarified them." Their new rules even allow for computerization of the engineering change proposal process.

Lager is also Grumman's representative on the Electronics Industry Association's committee on configuration and data management, oversees four committees in the association and is its past president. By tackling a military standards revision project, Lager helps make Grumman's point of view known when the military writes new rules that will affect a contractor's ability to do the work efficiently and economically.

A Network Of Help

Norm Francik works by himself at Tinker Air Force Base, Oklahoma, as a field engineer for Grumman Systems Support. In his year at Grumman, he has met fewer than a dozen other company employees.

But when his house burned down November 30, co-workers all around the U.S. helped him out.

"My wife and I went out to dinner, then did some Christmas shopping," says Francik. "When we got back at 10 p.m., the house was surrounded by about 20 fire trucks. It's a helpless feeling, watching everything you own go up in smoke."

Francik's pet terrier died in the blaze, but two other dogs were outdoors at the time and were unhurt. When it looked as if the fire would spread to the adjacent barn, the couple borrowed a trailer to evacuate their horses. Fortunately, the blaze never got that far.

The couple lost all their possessions in the fire, including valuable photographic equipment and antiques. They went to a friend's house that night with only the clothes they were wearing.

"We lost all our important papers," Francik says. "Our wedding license, my Air Force retirement papers, all my kids' photos."

The next day, Francik notified the division's regional office in Austin, Texas, that he wouldn't be able to come to work for a few days — and the Austin people took up a collection for him. At the division's central payroll office in Gaithersburg, Maryland, administrative assistant Norma Rominger did the same and got the word out to the other field sites.

Grummanites from Woodbury, Long Island just happened to be visiting Gaithersburg at the time. When they returned home, they passed the hat, too.

Francik says his insurance will pay for a similar house. Awaiting the final settlement, the Franciks are living in a house trailer on their property.

"Most of my contact with other Grummanites has been on the phone," says Francik. "It's a good feeling to know your co-workers will help when you really need it."

Award For Andres

Barry Andres, manager of Environment and Ground Facility Operations for Grumman's Long Island plants, was recently honored by the Long Island Chapter of the New York Water Pollution Control Association.

Barry Andres

Andres received the group's chapter achievement award, for outstanding contribution to the field of water pollution control.

Andres is chairman of the chapter's Industrial and Hazardous Waste Committee and is a member of a similar committee in the state association. He has been a member of this organization since 1957.

At Grumman, Andres' department is responsible for a number of facilities that handle industrial waste. There are two treatment plants in Bethpage, one in Calverton, and collection stations in Bethpage, Calverton, and Great River.

Metamorphosis

If you visit the Grumman plant in Sherman, Texas, be sure to ask Arthur "Sleepy" Davis for a spin in his street rod.

The vehicle is an automobile, dune buggy, pickup truck, and antique car all rolled into one. Not only is it fun to drive — it's economical on fuel and has peppy acceleration.

Davis started with the frame of a Ford Model T sedan. He installed a 1970s-vintage Chevrolet 350 turbo engine; a 1960s Chevy II rear end; a Corvair front end; and Ford rack-and-pinion steering.

The exposed gas tank is an ordinary metal barrel, but capped by a plastic duck. The canvas roof has been lowered three inches; the vehicle's chassis, seven. This enables it to hug the road better, although it does make for a bumpier ride.

"The idea is to come up with crazy combinations and make them work," says Davis, a leadworker in Body Buildup at this Olson truck plant. He also owns a 1957 Chevrolet pickup, rebuilt in like manner. He's now working on a Ford Model "A" sedan.

Pride And Joy. *"Sleepy" Davis' converted Model T gets rave reviews at shows for street-rod enthusiasts. He occasionally uses it to commute to work at Grumman Olson in Sherman, Texas. Davis is a leadworker at the plant.*

M. E. Antonucci

M. C. Argenio

J. L. Arola

M. A. Brill

N. P. Calabria

A. Cammalleri

A. Collins

A. J. Duval

D. C. Engle

H. Fine

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J. J. Hopkins

B. Hutt

M. J. Lage

C. J. Lekoski Jr.

P. C. Lugbauer

J. T. Luna

A. Martin

L. L. McCoy

W. Meinck

Service Milestones

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Edward J. Dietz, Calverton, Aircraft Systems
David M. Dudick, Bethpage, Space Systems
David C. Gaynor Jr., Great River, Electronics Systems
William Kielbasa, Bethpage, Aircraft Systems
Carl A. Lubin, Melville, Aircraft Systems
Burton H. Pettit, Bethpage, Aircraft Systems
George R. Rose Jr., Calverton, Aircraft Systems
Valentino Tassone, Great River, Electronics Systems
Robert J. Wood, Melville, Aircraft Systems

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Neal A. DeLuca, Bethpage, Aircraft Systems
Robert A. Jasinkonis, Bethpage, Corporate Services
Arthur Mauriello, Bethpage, Aircraft Systems
Harold M. Moss, Bethpage, Corporate Services
John Umstetter, Calverton, Aircraft Systems
Orlando Vescio, Bethpage, Aircraft Systems
David L. Walsh, Bethpage, Grumman Corporation
Richard Wink, Calverton, Aircraft Systems

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Elmer O. Baumgart, Calverton, Aircraft Systems
Robert C. Beckmann, Melville, Aircraft Systems

G. Metzger

G. E. Mitchell

A. F. Molnar

S. A. Murray

L. P. Nardo

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W. F. Noonan

S. Pearlman

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H. C. Potonides

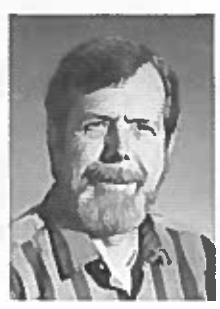
F. V. Reiff

D. F. Reis

J. F. Rom

L. G. Rooney

J. J. Ryan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G. Sheredos

V. E. Smits

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Claudio J. Bosque, Bethpage, Aircraft Systems
William A. Botticello, Bethpage, Aircraft Systems
Rosario A. Bracco, Calverton, Aircraft Systems
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(Continued on page 8)

Service Milestones

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Robert A. Sullivan, Great River, Electronics Systems
Richard W. Tiedemann, Melville, Aircraft Systems
Herbert W. Timmerman, Great River, Electronics Systems
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Donald H. Wieman, Melville, Aircraft Systems
William F. Wilber, Calverton, Aircraft Systems

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Michael C. Argenio, Bethpage, Aircraft Systems
John L. Arola, Irvine, Space Systems
Henry J. Baluta, Melville, Aircraft Systems
Murray A. Brill, Melville, Aircraft Systems

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R. T. Tolle

M. Turner

F. Vozzolo Jr.

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Nicholas P. Calabria, Bethpage, Aircraft Systems
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Arthur J. Duval, China Lake, Aircraft Systems
David C. Engle, Melbourne, Melbourne Systems
Carmelo D. Femia, Great River, Electronics Systems
Howard Fine, Melville, Aircraft Systems
Stephen Gamrat, Bethpage, Aircraft Systems
Charles T. Gelling, Melbourne, Melbourne Systems
James R. Gould Jr., Melville, Aircraft Systems
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Eugene W. Hansen, Bethpage, Aircraft Systems
Robert J. Henke, Calverton, Aircraft Systems
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Boyd Hutt, Woodbury, Data Systems
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Walter Meinck, Melville, Aircraft Systems
Gerald Metzger, Sturgis, Allied Systems

R. T. Weil

R. A. Wies

R. J. Williams

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Thomas D. Wood, Bethpage, Aircraft Systems

A Rise In Unit Values

The Employee Investment Plan's unit values as of January 31 (compared to December 31) were:

Equity Fund
4.910 (up from 4.605)
Fixed Income Fund
6.410 (up from 6.327)
Guaranteed Income Fund
2.984 (up from 2.960)
Company Stock Fund
$20.18 (up from $19.94)

Readership Survey

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Mail to: Grumman World, A22-GHQ
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Deadline Is April 28 For '89 Photo Contest

All Grummanites are invited to enter the 1989 Public Affairs photography contest.

Winning entries will be enlarged to 20x30 inches, framed, and then displayed in Corporate Headquarters for one year. Upon completion of the exhibit, the framed prints will be returned to the winners along with an 8x10 inch negative of the print.

Here are the contest rules:

- All photographs must be in color.
- Any size print can be submitted.
- An original negative or slide of the submitted photo must be available upon request.
- All photos must be clearly labeled with your name, mail stop, and telephone number.
- Include where the picture was taken and with what kind of camera and lens.
- Limit is four pictures per person.

Entry deadline is April 28; winners will be announced by May 12.

Mail entries to Caroline Menezes, A33-GHQ. If you have any questions, call Menezes on (516) 575-2898.